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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/985,737

11/06/2001

Yoshinori Terui

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06/08/2004

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1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

KEANEY, ELIZABETH MARIE

ART UNIT

PAPER NUMBER

2882

DATE MAILED: 06/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/985,737

Applicant(s)

TERUI ET AL.

Examiner

Elizabeth Keaney

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of the Amendments and Remarks filed 22 March 2004.

Response to Arguments

Applicant's arguments with respect to claims 1 and 3-11 have been considered but are moot in view of the new ground(s) of rejection.

Priority

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 16 May 2000. It is noted, however, that applicant has not filed a certified copy of the 2000-143087 application as required by 35 U.S.C. 119(b).

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "electron emission surface being spherical" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. It appears to the examiner that the newly submitted Figure 4 shows a rounded electron emission surface rather than a spherical tip.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3,4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa et al. (US Patent 4,430,570; hereinafter Takigawa) in view of Veneklasen et al. (US Patent 6,392,333; hereinafter Veneklasen).

Re claim 1: Takigawa discloses, in figure 1 and throughout the disclosure, an electron gun (10) comprising:

- an electron emission cathode (12);
- a control electrode (14); and
- an extractor (20),
- wherein the electron emission cathode is spherical (column 3, line 23) and made of rare earth hexaboride (column 1, line 64).

However, Takigawa fails to teach or fairly suggest the electron emission cathode being located between the control electrode and the extractor.

Veneklasen discloses an electron gun having an electron emission cathode located between a control electrode and an extractor (column 2, lines 46-47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Takigawa to include the electron emission cathode located between the control electrode and the extractor because it allows the emitted

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beam to be better focused by preventing the thermionically emitted electrons from being emitted from anywhere but the tip of the electrode thereby improving the intensity of the beam without an increase in power supplied to the device (Veneklasen, column 2, lines 43-48).

Re claim 3: Takigawa discloses an apex angle of the tip portion of the electron emission cathode being 50-100° (column 5, line 8)

Re claim 4: Takigawa discloses the rare earth hexaboride to be lanthanum hexaboride (column 1, line 64).

Re claim 11: Takigawa discloses an angular intensity of 0.2-70mA/sr being provided in the application of a driving voltage of 1kV (column 5, line 33).

Claims 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa and Veneklasen in further view of Hohn (US Patent 4,468,586).

Re claim 5: Takigawa discloses, in figure 1 and throughout the disclosure, an electron gun (10) comprising:

- an electron emission cathode (12);
- a control electrode (14); and
- an extractor (20),
- wherein the electron emission cathode is made of rare earth hexaboride (column 1, line 64).

However, Takigawa fails to teach or fairly suggest the electron emission cathode having an electron emission surface being flat.

Hohn discloses, in figure 5.6 and throughout the disclosure, an electron gun comprising an electron emission cathode having an electron emission surface being flat (column 10, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute an electron emission cathode having an electron emission surface being flat for the electron emission cathode of Takigawa because by using a flat topped electron emission cathode the emission from the cathode is maximized thereby increasing the intensity of the device without increasing the power required by device (Hohn, column 3, line 6).

Takigawa and Hohn further fail to teach or fairly suggest the electron emission cathode being located between the control electrode and the extractor.

Veneklasen discloses an electron gun having an electron emission cathode located between a control electrode and an extractor (column 2, lines 46-47).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Takigawa and Hohn to include the electron emission cathode located between the control electrode and the extractor because it allows the emitted beam to be better focused by preventing the thermonically emitted electrons from being emitted from anywhere but the tip of the electrode thereby improving the

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intensity of the beam without an increase in power supplied to the device (Veneklasen, column 2, lines 43-48).

Re claim 6: Hohn discloses a diameter of the flat electron emission surface to be 5-200 μ m (column 9, lines 15-16).

Re claim 7: Hohn discloses the electron emission cathode being made of a single crystal of rare earth hexaboride (column 2, line 65) and the electron emission surface of the electron emission cathode having a <100> face (column 3, line 22).

Re claim 8: Hohn discloses the rare earth hexaboride being lanthanum hexaboride (column 2, line 65).

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa and Veneklasen as applied to claim 1 above, and in further in view of Hiraoka et al. (US Patent 4,311,941; hereinafter Hiraoka).

Re claim 9: Takigawa and Veneklasen show all the limitations above, including the electron emission cathode located between two heaters (Takigawa, Figure 2A, 54).

However, Takigawa and Veneklasen are silent as to the material the heaters are comprised of.

Hiraoka discloses heaters for use in an electron gun being comprised of carbon (column 3, line 12).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a carbon heater within the device disclosed by Takigawa and Veneklasen because carbon has excellent conductive properties thereby heating the electron emission cathode faster to produce a instantaneous emission.

Re claim 10: Hiraoka discloses the carbon used for the heaters being pyrolytic carbon (column 3, line 12).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- US Patent 4,924,136 discloses a wehnelt electrode to be a control electrode (column 1, line 65).


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-2489. The examiner can normally be reached on Monday-Thursday 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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DAVID V. BRUCE
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